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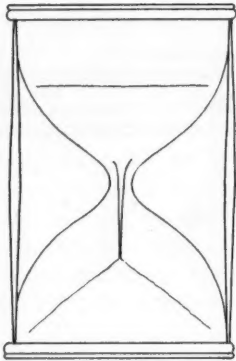
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ORIGINAL ARTICLES

THE USES OF LIPIODOL IN NEURO-ORTHOPEDIC SURGERY*

BY HENRY McCUSKER, M.D.

PROVIDENCE, R. I.

In all branches of medicine there is rightly a constant striving for greater accuracy in diagnosis. Gradual improvements and newer methods in X-Ray technique are making visible various systems in the body not previously demonstrable by roentgen examination. A new procedure which presages to be of immense value in diagnostic work in many fields is the use of Lipiodol as a radiographic medium.

Lipiodol is poppy-seed oil containing about 40% of Iodine in organic combination. It is a thick, yellow, oily liquid with high specific gravity (1.350). It is opaque to X-Rays, hence its value as a contrast medium in roentgen examination. Because of its weight Lipiodol descends rapidly until it meets with an obstruction. It is well tolerated by all tissues of the body, even those of the brain, and injections of Lipiodol are not painful.

Lipiodol was first used by Sicard and Forestier in France in 1921. Recently it has been used in many branches of surgery as a diagnostic measure. I shall speak to-day only of the important applications of Lipiodol in orthopedic and neurological surgery.

In Sinuses

In discharging sinuses of bone tuberculosis or osteomyelitis it is often very difficult to determine accurately the origin of the sinus. In many cases X-Ray examination alone will not suffice, particularly if several areas are involved. Bismuth paste has been used with some success but where the sinus is tortuous and the lumen small the bismuth is apt to be arrested along the track and may give rise to errors in the X-Ray interpretation. Be-

cause of its oily character and because of its weight Lipiodol flows readily along the course of the sinus even when the latter is very narrow.

Technique:—First a probe is inserted into the sinus to get a general idea of the direction of the sinus. Then with a syringe Lipiodol is injected into the opening of the sinus and the patient is placed in such a position that the mouth of the sinus is uppermost. After one hour, stereoscopic X-Rays are taken and the Lipiodol will be seen in the track of the sinus. I have selected a few lantern slides to show this application.

Case 1:—P. P., No. 28,229, male, age 36, came to me February, 1928, for treatment of a persistent discharging sinus above the right elbow. He gave a history of sudden onset of pain and swelling in the elbow in 1926. Incision over the distal end of the upper arm was made at that time and a discharging sinus developed despite efforts to close the wound. In the following two years he had been operated seven times in various attempts to close the sinus, the operations consisting of curretting the distal end of the humerus and olecranon where X-Rays showed roughening and irregularity in contour of the bones. Bismuth paste had been injected for X-Ray study, and methylene blue was injected as a guide before one of the later operations. Despite all efforts during a seven months hospitalization the sinus persisted. I injected 2 c.c. of Lipiodol into the sinus opening and had X-Rays taken immediately. These show the sinus apparently entering the elbow joint. An X-Ray taken after the arm had been pendant for one half hour shows the sinus leading to the proximal and inner surface of the ulna. At operation a subperiosteal abscess was found and the area curretted. The sinus was obliterated and has remained closed for the past year.

Case 2:—A.R., #18379B, age 29, male, developed a swelling in the right thigh in March 1929, followed in a few weeks by a discharging sinus in the mid $\frac{1}{3}$ of the right thigh on the antero-lateral aspect. X-Ray showed what appeared to be some irregularity about the superior margin of the acetabulum. X-Rays of the shaft of the femur showed

*Read before the Rhode Island Medical Society June 6th, 1929.

no evidence of bone pathology. One hour after injection of Lipiodol, X-Rays showed the opaque shadow of the Lipiodol from the sinus-opening up along the shaft of the femur to the wing of the ilium. This patient is still under observation.

In The Epidural Space

Lipiodol may be injected through the sacro-coccygeal joint into the epidural space.

Technique:—The instruments are the same as those used in lumbar puncture. The patient lies in a prone position on the table. After cocainizing the sacro-coccygeal joint a lumbar puncture needle is inserted into the sacral canal in the direction parallel to the body of the sacrum. Care should be taken not to penetrate the dura. One or two c.c. of $\frac{1}{2}$ novocaine is then injected through the needle and if this injection is easily accomplished one can be sure the needle is in the epidural space. Three c.c. Lipiodol may then be injected. The patient is then put into the knee-chest position for one hour, at the end of which time X-Ray examination is made.

Normally Lipiodol will be seen in the roentgenogram as elongated splotches extending up the epidural space. An abrupt stoppage of the Lipiodol in its course will be seen in destructive lesions of the spine like carcinoma, tuberculosis, and fracture with or without dislocation. By this procedure Spina Bifida Occulta may also be demonstrated. There will be no stoppage of the Lipiodol in arthritis, scoliosis, and chronic spondylosis.

In The Subarachnoid Space

Perhaps the most striking application of the Lipiodol method of diagnosis, and the one with which I have had most experience, is in the exploration of the subarachnoid space.

Until recently the localization of intervertebral lesions was a difficult procedure and in many cases one fraught with a considerable margin of error. Previously it was customary to do a lumbar puncture to determine the presence of the so called "pressure fluid." If the block was not complete the spinal fluid was likely to be quite normal macroscopically, microscopically, and chemically. The skin was then tested for pain and thermal sensation. The upper level of the area of diminished sensation, if present, gave the index as to the location of the block. Such findings were extremely

unreliable because of the non-cooperation or the emotional instability of many patients, or because the sensory changes were not well defined. It was necessary then to wait until the sensory line was established before localization could be estimated. Treatment then consisted in an Exploratory Laminectomy — the removal of two vertebrae above and two vertebrae below the level of the suspected block. If nothing abnormal was encountered in this region, the laminectomy was continued upward and downward — in all a very difficult operation both for the patient and for the surgeon. With Ayer's introduction of puncture of the Cisterna Magna a new impetus was given to studies of the dynamics of the spinal fluid and to spinal conditions affecting it. By this new method it became possible to determine with a considerable degree of accuracy the presence of a block — complete or incomplete — in the subarachnoid space. The technique is as follows:—The patient is placed on the table directly on his left side. A lumbar puncture is performed. An air manometer marked off in millimetres is attached to the lumbar needle, care being taken against any loss of spinal fluid. The patient's head is then flexed on the chest, and another needle inserted through the dura into the cisterna magna. The stillette is withdrawn and the air manometer attached to this needle. Both manometers are identical in size and in scale. If no obstruction is present in the subarachnoid space the spinal fluid should rise to the same level in the cistern and in the lumbar manometers. The oscillations due to pulse pressure and to respiration should also be identical. Pressure on the jugular veins should cause elevation of the fluid level in both manometers, as should also pressure over the abdomen. In normal patients, removal of spinal fluid from the lumbar region will cause a drop in the fluid level of both manometers. Removal of fluid from the cistern should likewise cause a lowering of the fluid level in both manometers. On the other hand, if there is some obstruction between the cistern and the lumbar regions of the subarachnoid space, variations in the readings will occur, i.e., the cistern fluid will be at a higher level than the lumbar; the oscillations will be more pronounced in the upper manometer than in the lumbar one; pressure on the jugular veins will show a greater rise in the cistern than in the lumbar, and finally removal of the fluid from the lumbar spaces will cause a marked fall in the

lumbar manometer and a proportionately lesser fall in the cistern. These findings vary with the completeness of the spinal block. The fluid from the cisterna and the lumbar fluid are then examined separately for the color, number and type of cells, protein and globulin. By this method it becomes possible to determine the presence of a tumor even before it has progressed sufficiently to cause a spinal canal block with characteristic symptoms. In other words, a diagnosis of spinal canal block can be made early, and treatment instituted before the cord is seriously compressed. While this combined puncture is of great aid in making a diagnosis of compression between the cistern and the lower lumbar vertebrae, it does not aid in the accurate localization of the block.

In cases where the combined puncture demonstrates an obstruction, the needle in the lumbar region is withdrawn. After removing the manometer from the needle in the cistern, $\frac{1}{2}$ c.c. of Lipiodol is injected into the cisterna magna. The patient is immediately placed in a sitting position and if feasible fluoroscopic examination is made to watch the descent of the Lipiodol. A roentgenogram is immediately taken of the entire spine to determine whether or not there is a temporary arrest of the opaque medium.

The patient is returned to bed and kept in the erect posture for 24 hours, at the end of which time the X-Ray examination is repeated. If the Lipiodol meets an obstruction it stops and is very clearly seen in the roentgenogram. If the subarachnoid is free the shadow of the Lipiodol will be shown in the lower end of the canal. This program of examination was used in the following cases:

Case 3:—D. J., No. 987, female, housewife, age 64.

She gave the history of occasional pains in her neck and occipital headache since 1922. In 1924 she had pain and tenderness in her right eye with failing vision. In 1925 at the New England Deaconess Hospital, an enucleation of the right eye was done. The pathologic examination of the eyeball showed "a slightly melanated sarcoma of the choroid. There was no indication of the spread of the sarcoma and in all probability the removal was complete and probably early, as there is no involvement of the optic nerve." She made a good recovery from the operation and was in fairly

good health until six months previous to my first examination. At that time, she complained of severe pains in both legs with fatigueability. She came under Dr. Donley's care in April, 1928, and Dr. Donley sent her into the hospital for investigation. She appeared older than her alleged 64 years and showed poor muscle tonus generally. She was bedridden because of pain and weakness in both legs. Over the 3rd. dorsal vertebra a slight fullness was found with tenderness to pressure over this area. There was no edema of the legs. All motions of legs were performed weakly and showed marked fatigueability. She complained of a sense of numbness alternating with extreme hypersensitiveness from her toes to the level of the umbilicus. No definite sensory level could be made out because of the restlessness of the patient. X-Rays taken an admission to the hospital showed no evidence of destructive bone disease, and no deformities or displacements to account for the cord pressure symptoms. Blood Wassermann was negative. A combined cistern and lumbar puncture was performed which showed the pressure in the cistern manometer about 25mm. higher than in the lumbar during the various tests. The protein content of the cistern fluid was 35 mg. as compared to 425 mg. in the lumbar fluid. Globulin was absent in the cistern fluid and was three plus in the lumbar fluid. The cell count was 3 in each fluid.

$\frac{1}{2}$ c.c. of Lipiodol was then injected into the cisterna magna. X-Rays taken immediately after the injection showed the Lipiodol arrested at the level of the 3rd. dorsal vertebra. The patient was kept in a sitting position for 24 hours and X-Rays were again taken. These show the entire amount of the Lipiodol suspended at the 3rd. dorsal vertebra. A diagnosis of complete spinal block was made. While the possibility of malignancy was considered, we deemed it advisable to do a laminectomy in the hope of relieving the pains in her legs which were becoming increasingly severe. At operation a darkly colored tumor was found just posterior to the lamina of the 3rd. dorsal vertebra on the right side. The 3rd. dorsal vertebra itself was found to be deeply discolored but normal in contour. The dura was normal in appearance while the arachnoid was thickened and adherent to the dura at the level of the 4th. dorsal vertebra. In the sac thus formed was a thick gelatinous fluid with some oily drops, probably Lipiodol. The

arachnoid was incised and the fluid was released. A probe inserted above and below showed no evidence of further block. Sections of bone from the spine and the excised tumor were sent to the Laboratory for pathological study. The pathologic diagnosis was: "mixed cell sarcoma with considerable melanin deposits. Infiltration of mixed cell sarcoma into the body of the spine."

Following the operation the patient's condition became gradually weaker and on the 7th day after operation, she died. I show this case to demonstrate the use of Lipiodol in Arachnoiditis.

Case 4:—L.M.B., No. 22,017, woman age 56, was referred to me in February, 1928, for treatment of Arthritis in the hips and lower spine after X-Ray examination had shown advanced hypertrophic changes in these joints. She gave a history of aching feet followed by fleeting sharp pains and varying degrees of weakness in both legs, the right more pronounced. On examination no definite level of anaesthesia could be made out but there was diminished sensation from toes to hips and through both inguinal regions (level of the 8th Dorsal segment). Thermal sense was intact to both legs. There was definite weakness in both legs without frank paralysis. A combined cistern and lumbar puncture was performed and gave indications of a partial block in the subarachnoid space. $\frac{3}{4}$ c.c. of Lipiodol was then injected into the cisterna magna. X-Rays taken immediately showed the Lipiodol arrested at the level of the eleventh Dorsal interspace. X-Rays taken 24 hours later showed the Lipiodol still at the eleventh Dorsal interspace. A laminectomy was done—a tumor mass, four inches long was found extending from the eleventh Dorsal vertebra to the first Lumbar on the right lateral and slightly anterior side of the cord. The tumor was adherent to the wall of the dura by a pedicle. The tumor was removed and sent to the Laboratory for microscopical study. Pathological report on tumor:

"Connective tissue with some blood vessels and small amount of fatty tissue. Slight round cell infiltration. Diagnosis: benign tumor." This patient made a good recovery. She is free from leg pains and has regained all the power in her left leg. There is some weakness in the dorsiflexors at the right ankle. This case shows that localization by sensory level alone may be inaccurate.

Case 5:—E.H., No. 549, female, age 68. In 1925 I was asked to see this patient and to recommend some type of apparatus to make her more ambulatory. Three years previously, while doing her housework, she fell and injured her back. Immediately following this injury she noticed numbness in her feet, gradually extending up her legs to the thighs. These symptoms subsided after a few weeks and she resumed her usual activities. One year later she again had pains in both legs and for two years was under medical treatment for "Rheumatism." Just prior to the time I first saw the patient she had been under investigation at one of our larger hospitals for a period of three weeks. X-Rays of her spine were taken and reported "negative for spinal fracture." She was discharged from the hospital with the diagnosis: "Paraplegia (cause unknown)." The patient had been confined in bed for many months and because of her obesity could be moved about only with the greatest difficulty.

Examination showed the right leg very edematous, with beginning decubitus over the right buttock. There was no voluntary motion in her toes, ankles, knees, or hips. She could not distinguish hot or cold sensations on the skin from the toes to the costal border. She recognized painful pricking in the right leg but was uncertain on the left leg.

A lumbar puncture was done at her home and spinal fluid pressure records were taken—all apparently normal. The spinal fluid was clear, did not coagulate. Wasserman negative, 1 cell per cmm. Globulin not increased, sugar present in the spinal fluid but not estimated quantitatively. I sent the patient to a hospital for further study. A combined cistern and lumbar puncture was performed with findings suggestive of partial block between the lumbar and cistern regions. One c.c. of Lipiodol was then injected into the cistern and in the immediate roentgenogram showed at the level of the inferior surface of the fourth Dorsal vertebra. X-Rays taken after the 24 hour interval showed the greater portion of the Lipiodol at the same level, with a few drops at a lower level. At operation a tumor delivered itself when the dura was opened. It was about the size of an English walnut and was connected to the cord by a small pedicle. Histologically it was found to be an intradural fibroma of the spinal cord. In four months she was getting

about her house and yard without assistance. Six months after the operation she was doing the major part of her housework. It is now over four years since her operation and she shows no residuals. Her recovery is complete.

SUMMARY

1. In tracing sinuses, the use of Lipiodol will give more accurate X-Ray findings than will the use of other opaque media.

2. With Lipiodol in the epidural space, limits of destructive lesions like tubercular pachymeningitis, primary or secondary cancer, and spinal fractures can be outlined.

3. Where the sensory findings are in doubt and where combined Cistern-Lumbar puncture demonstrates an obstruction, Lipiodol in the subarachnoid space will clearly locate the block.

4. The injection of Lipiodol is without pain and is a safe procedure.

DISCUSSION

DR. DONLEY: It is a real pleasure to have heard Dr. McCusker's paper because it is a notable example of the progress in knowledge and in methods which has raised modern medicine from an art of observation and empiricism to an applied science founded upon research; from a craft of tradition and sagacity to an applied science of analysis and law; from a descriptive code of surface phenomena to the study of deeper affinities; from a set of rules and axioms of quality to measurements of quantity.

As one looks back over the history of neurology it is marvelous to think that so much progress should have been made in the diagnosis and treatment of spinal cord disorders between 1887 and the present day. And yet it was only so long ago as 1887 that Sir William Gowers first diagnosed and Sir Victor Horsley first successfully removed a tumor from the spinal cord of a man, aged 42, who had been travelling all over the world seeking relief from excruciating pain in the left scapular region together with progressive loss of power in the legs which were the seat of constant spasmodic twitchings. This patient was thought to have an aneurysm, disease of the vertebral column and a number of other things until Sir William Gowers without the aids

of lumbar puncture of the X-Rays or Lipiodol, concluded that the patient was suffering from compression of the spinal cord due to pressure from a tumor and advised an attempt at its removal. It is as dramatic as anything in medical literature to read this stirring report of Gowers and Horsley which is to be found in the *Medico-Chirurgical Transactions of London* for the year 1888 under the title, "A Case of Tumor of the Spinal Cord." Removal. Recovery.

The tumor was a benign growth, a fibromyxoma, an oval or almond-shaped body of a dark, bluish-red color, resting on and attached at its lower extremity to, the highest root of the left fourth dorsal nerve, just where the posterior nerve roots were gathered together in one trunk. It had impressed itself on the lateral columns of the cord and produced there a deep longitudinal groove which accounted for the patients symptoms. I may add that the man made a complete recovery and that the technique of laminectomy described in this paper by Sir Victor Horsley is in all essentials that followed by Dr. McCusker and other surgeons to-day. What spectacular progress was set on foot by this case of Gowers and Horsley may be realized by a perusal of the table and analysis of symptoms which is appended to the paper. Here are the chief clinical facts relating to 57 other cases of cord tumors reported in medical records which disclose the melancholy fact that had operation been resorted to after correct diagnosis 80 per cent of these tumors should have been removed whereas 100 percent of the patients died.

It is difficult for us who witness the skill and finesse with which Dr. McCusker and other surgeons perform laminectomy to realize that in 1887 this operation was looked upon with fear and dread. Perhaps it may be of interest to note that laminectomy was first proposed to the profession by the eighteenth century German surgeon, Lorenz Heister who made the first post-mortem section of appendicitis and introduced the term tracheotomy. Writing in the sixth edition of his *General System of Surgery* published in 1757, at page 140, he is discussing the treatment of injuries to the spine and speaks as follows: "But to offer the patient no assistance because we despair would seem cruel and uncharitable, therefore we must try our skill though our attempts should be in vain; in order to which

the surgeon must lay bare the fractured vertebrae with a scalpel and replace or else remove such fragments as injured the spinal marrow." And yet 124 years later, while discussing the treatment of fractures of the spine, Mr. Herbert Page says in Heath's Directory of Surgery, published in 1881, "The operation of trephining the spine, proposed many years ago and adopted several times, has made no progress in surgery, nor is it likely to do so It is an operation not within the range of practical surgery." One of the first to rise and congratulate Sir Victor Horsley at the Medico Chirurgical Society's meeting was Mr. Herbert Page.

These surgeons, be it observed, were discussing laminectomy as a therapeutic procedure in cases of fracture of the spine. That this operation might be useful in other than fracture cases never entered their heads. The reason for this is clear enough. They were operating in pre-Listerian days and the enemy was sepsis. Furthermore, the diagnosis of spinal neoplasms, as to their localization, was in the womb of the future. Erb, writing on diseases of the spinal cord in Ziemssen's Handbook in 1878, remarks that "If the diagnosis and location of a tumor were certain, one would think of a trephining of the spine. Only rarely could sufficient support for the diagnosis be obtained to justify the heroic operation of laminectomy. Success from such a surgical procedure was not beyond a possibility." A few years later, in 1882, the great clinician, Austin Flint, wrote in his Practice of Medicine, "the existence of an intraspinal tumor can hardly be determined with certainty, and assuming that a tumor exists, to determine its character from the symptoms, is impracticable."

With this brief sketch by way of orientation in our minds, let us return to Dr. McCusker.

We will all agree, I suppose, that the diagnosis of spinal cord disorders is not easy—not easy that is, if we demand of ourselves the fulfillment of those conditions which Hughlings Jackson insisted are necessary to a complete diagnosis. You will remember that this great man, as rich in philosophic depth as he was acute in observation, taught that a satisfactory diagnosis must establish three things, first, damage of organ, the anatomy; second, disturbance of function, the physiology; third, disease of tissue, the pathology. Insofar as any of these elements is incomplete or

lacking in just that degree is our diagnosis limited and unsatisfactory.

Now with respect of spinal cord diseases, it is usually possible from a careful history and a painstaking physical examination to determine the anatomy, namely, that it is the spinal cord which is the seat of the disturbance. But to elucidate the precise level of the mischief, and to decide upon the disease of tissue, the pathology, is many times difficult and sometimes even impossible. In the study of functional disturbance we must rely in part upon the co-operation of the patient, and we all know from experience how inconstant and misleading this may be. In the matter of the determination of sensory changes, for example, so important in their meaning, we are at the mercy of the patient even when he is intelligent, and when he is not, we are led into a mirage. So it turns out that the precise delimiting of sensory changes and levels is not infrequently unsatisfactory or perhaps impossible. As to the third element in the diagnosis, the disease of tissue, we are likely to be in even a more unsatisfactory situation. When we have made up our minds to the anatomical and physiological changes we are left with several options in the matter of pathology, for here as elsewhere in medicine, things may not be what they seem. In these complexities and perplexities Lipiodol, that is to say iodine in poppy oil, and the X-Ray come to our assistance.

I think most physicians will agree that the determination of the existence of spinal cord compression is often a question of the greatest difficulty, and yet if we leave it unanswered we are in all likelihood depriving the patient of operative relief or cure for his symptoms. The introduction of Lipiodol or of any other foreign body within the confines of the central nervous system should be undertaken only when there is a real need. But when this need exists we ought to employ every means at our command to enlighten our ignorance or dispel our doubt. This is especially true when we suspect the presence of cyst, tumor or other pathological which may be amenable to surgical help. I can imagine nothing more tragic than to misjudge the presence of a removable cord disease because of failure to employ all the aids which are at our disposal. Of these aids, Lipiodol, is one of the most useful. We are of course aware that its employment is,

or may be, attended with some dangers, but if it is not used where it is not necessary, I would say that it is far, far better to risk any ill effects from the injection of Lipiodol than it is to risk the state of hopeless invalidism and death which must result from an unrelieved compression of the spinal cord.

And let us not expect too much from any diagnostic method. Lipiodol enables us to project a shadow upon a X-Ray film. It does this well but it does no more. The film will not interpret itself and all like shadows may on occasion mislead us. But that is not the fault of the film. What the film records is true enough, that the Lipiodol is held up at a certain place or places in the spinal canal. The error may arise when we attempt to attach a meaning to what the film records. But this is just another way of saying that our knowledge is incomplete. If, however, when confronted with the momentous decision as to the presence or absence of removable compression, we have exhausted all the aids open to us from careful clinical study together with such assistance as comes from the chemical and dynamic study of the cerebrospinal fluid and are still in doubt, then the assistance of Lipiodol injection should be invoked. And may I say in concluding that it is a good practical rule to regard all non-inflammatory spinal cord conditions as being potentially due to removable compression, until this postulate is proved to be not true.

A REPORT ON PHARYNGEAL ANESTHESIA.*

BY ALBERT H. MILLER, M.D.,
PROVIDENCE, RHODE ISLAND

The title originally chosen for this paper was "*500 Consecutive Cases of Pharyngeal Anesthesia without Death or Complication.*" On submitting this title to a member of the club, the objection was raised that it is unfair to date a series of cases back to but not including the last unfavorable case. This objection seems a fair one and the title and form of the paper have been changed accordingly. In the present series of 3,000 consecutive operations, pharyngeal anesthesia was employed 499 times. In these 499

cases there were no deaths and one minor complication. These cases continue a series previously reported in which pharyngeal anesthesia was employed 118 times in 1,000 consecutive cases.¹

It is difficult to form an opinion as to the results of anesthesia because these results are so closely related to other factors of surgical work. Many of the patients who seek benefit from surgery are not in the physical condition which we would choose for the successful performance of the required operations. Surgical risk varies from the operation of choice on a healthy patient to the operation of last resort on a patient whose resistance has been lowered by severe or long continued illness. A proportion of operations must be expected to be followed by complications and fatalities depending on the character of the work undertaken and performed. If no fatalities occur in a long series of unselected cases, the result must be attributed to skillful anesthesia and surgery and frequently also to good fortune.

A death which occurs while the anesthetic is being administered but before the operation has commenced must be attributed to the anesthetic with almost complete certainty. Yet the numerous cases in which death has occurred while patients were in the hospital awaiting operation adds an element of doubt even in this class of cases. When death occurs during the performance of an operation, the anesthetic must be considered but in conjunction with the influence of the operation and the patient's condition. For an operation to be successful, it is not sufficient that the patient leave the operating room alive. He must be returned to his usual health and activity. In post-operative deaths and complications, the anesthetic must again be questioned. These deaths and complications usually occur within a few days after the operation. If no complications have arisen within two weeks, the outcome is usually assured. When the patient has made a satisfactory recovery we are certain that the anesthesia as well as the other factors of the operation has been successful.

To simplify the problem of surgical risk, the cases are separated into three classes:—

First: Cases apparently uncomplicated.

Second: Patients suffering from organic disease.

*Read before the Friday Night Medical Club of Providence, October 19, 1928.

¹Pharyngeal Insufflation Anesthesia, Miller, J. A. M. A. Aug. 5, 1922, 79, 441.

Third: Patients whose surgical conditions is so severe or so far advanced as likely to result in fatality.

In this series of 499 cases of pharyngeal anesthesia, 426 of the patients were of Class 1, 61 of Class 2, and 12 of Class 3. Among the Class 2 patients were three cases of heart block, one of coronary angina, and five cases of endocarditis with uncompensated valvular lesions. In two of the cases, the operation attempted under regional anesthesia, had been halted on account of the collapse of the patient and indefinitely postponed. Of the Class 3 patients there was one with sinus thrombosis and ten with advanced malignant disease.

The greatest number of operations were performed on the throat and upper air passages. The other operations included mastoid operations, cerebral decompression, laminectomy, operations for removal of diverticula of the oesophagus, breast amputations, operations on the cervical glands and on the Gasserian ganglion, various abdominal operations and one operation for removal of the rectum, sacrum and coccyx. In three cases the operation lasted for more than three hours.

The cases were checked up two weeks after operation for complications and fatalities. There were no deaths and only one complication, so slight as hardly to warrant attention. A cough and slight rise in temperature, which were noted 24 hours after a nasal operation, rapidly subsided. The results in this series of cases, so near to being perfectly successful, can not be attributed entirely to good fortune. The method of anesthesia is worthy of note.

The pharyngeal method of anesthesia probably originated in Providence, having been first used here more than 25 years ago. Active in its introduction were Dr. Frank B. Sprague and Dr. Edward S. Bacon. In its present form, ether vapor is produced in an automatic vaporizer and is blown into the pharynx through a tube introduced through the nose or mouth of the patient. In the jar of the vaporizer is ether vapor of a strength of 60% by weight, 29% by volume or 22 millimeters ether vapor tension. The percentage is kept constant by an electric heater controlled by a thermostat. The construction of

the vaporizer depends upon the law of physics that in a closed container the vapor tension depends upon the temperature of the liquid in the container. Liquid ether is kept at a constant temperature by the electric heater and thermostat. The ether vapor in the jar remains at a constant tension or percentage. To secure any required percentage of ether vapor, it is necessary to dilute this constant ether vapor with the proper proportion of air. An electric air pump is used to provide the current of air needed for pharyngeal anesthesia. It furnishes a current of from six to ten liters of air per minute. The air passages are of such size that the air current moves freely and is never under pressure. Normally this current passes through a by-pass attached to the vaporizer without the addition of any ether vapor. As the valve in the by-pass is gradually closed, an increasing amount of the air current passes through the jar of the vaporizer. In this manner any proportion of the ether vapor contained in the jar may be added to the current of air and blown into the pharynx of the patient. The proportion of ether vapor is constant but may be varied by opening or closing the valve of the by-pass. The construction of the vaporizer is such that it is not possible to force liquid ether into the patient's air passages. The tube leading from the vaporizer to the patient may be connected to either outlet of the vaporizer. As the valve in the by-pass has not been calibrated, the proportion of ether vapor drawn from the jar is not exactly measured and depends upon the judgment of the administrator which must be gained from experience. The setting of the electric thermostat may be disturbed by jarring. If the adjustment becomes lowered, the percentage of ether vapor may be insufficient. If the adjustment is raised, the liquid ether may be brought to the boiling point and the ether vapor tension greatly increased. It is necessary to frequently check up the accuracy of the thermostat setting by reading the thermometer which is attached to the vaporizer. This should remain at 90 degrees, Fahrenheit.

Delivery of the anesthetic vapor into the pharynx has evident advantages. Delivery in the mouth or nose is uncertain and inefficient as an unknown percentage of the vapor is wasted. In-

roduction of a tube into the larynx requires time and a profound initial anesthesia. Introduction of the pharyngeal tube through the mouth or nose is a simple matter and may be accomplished under light initial anesthesia. The tube should reach to a point opposite the tonsils. Delivery of the anesthetic vapor at this point is efficient and certain. Pharyngeal anesthesia has its greatest usefulness in operations about the face and upper air passages. As soon as the pharyngeal tube has been introduced, the anesthetist may withdraw to some distance and leave the operative field unimpeded by his apparatus. As the respiratory need of the patient is provided for by the current of air entering the pharynx, the face may be covered by the sheets and towels required for protection of the operative field. The pharyngeal method is chosen for operations which are to be performed with the patient in the prone position. In this position, the heavy anesthetic vapor constantly tends to gravitate downward and maintenance is difficult with the usual methods of etherization. Pharyngeal delivery does away with this difficulty.

The finely graduated dosage provided by the automatic vaporizer allows satisfactory anesthesia with a minimum amount of ether. The light zone of anesthesia which results contributes largely to the satisfactory recovery of the patients. In operations about the upper air passages, preliminary medication, which might inhibit the throat reflexes, is omitted. The degree of anesthesia should be so light that the coughing reflex is preserved. With this degree of anesthesia it is probably impossible for any foreign matter to be inspired through the larynx. Only in this way can we account for the absence of pulmonary complications in this series of cases.

That this degree of anesthesia is sufficient for the satisfactory performance of the usual nose and throat operations has been proved in the experience of many surgeons. Rather than theoretical advantages or objections in any method of anesthesia, it is the results which count. The results from pharyngeal anesthesia, carefully conducted with an efficient apparatus, leave little to be desired in the way of safety. This method is an essential unit in the anesthetist's armamentarium.

Nature of Operation and Results

Operation	Number of cases	Results*
Tonsil and adenoid	326	
Dental	34	
Mastoid	28	
Sinus	26	One developed cough
Breast	15	and fever lasting
Eye	12	for 24 hours.
Face	12	
Nasal septum	11	
Maxilla	6	
Cervical glands	6	
Goiter	5	
Brain	5	
Larynx	3	
Kidney	2	
Spinal cord	2	
Tongue	2	
Rectal	2	
Abdominal	2	
Total	499	

*Satisfactory except as noted.

In seven other operations, the tonsils also were removed.

PNEUMOCOCCIC EMPYEMA

Nine cases of pneumococcic empyema treated by intrapleural injections of ethylhydrocupreine hydrochloride are reported by Harry Lowenburg, Philadelphia (*Journal A. M. A.*, July 13, 1929). All the patients received intrapleural injections of ethylhydrocupreine hydrochloride (optochin). In four of them rib resection and drainage were done after from four to six injections of ethylhydrocupreine hydrochloride. All recovered completely after operation. Five patients were not treated surgically but made complete monopoperative recoveries. The mortality in the nine cases was nil. In those patients who recovered without surgery there was a gradual subsidence of fever with improvement in the physical signs. Those cases which were diagnosed late, and in which fever was slight or entirely absent, did not show any increase in temperature. Before the physical signs improved it was noted that in the favorable cases the pleural exudate, which sometimes reaccumulated before final recovery, thus accounting for the persistence of the physical signs, underwent retrogressive change; the pneumococci, too, became decidedly less and were less viable on culture, and in some cases did not grow at all on culture, although they were recoverable by direct smear.

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Dr. J. E. Raia, President; Dr. F. W. Dimmitt, Secretary-Treasurer.

The R. I. Medical-Legal Society—Last Thursday—January, April, June and October. Henry M. Boss, Jr., President; Dr. Jacob S. Kelley, Secretary-Treasurer.

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Meets the second Thursday in January, April,
July and October

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Meets the second Thursday in each month excepting
July and August

W. A. BERNARD	<i>President</i>	Woonsocket
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EDITORIALS

THE PHYSIOLOGICAL CONGRESS

The Physiological Congress, whose meetings in Boston recently have been finished, brought together physiologists of renown from all parts of the world. The Congress was generally regarded as one of the most successful and acted in a way as a clearing house of international work and ideas. Naturally many of the papers read represented new or nearly new work and a few of these were indeed startling.

The press eagerly reported the Congress and

featured prominently its activity. Such material could easily become flaming headlines of the most false and unusual sort. Untrue sensational newspaper accounts not only buoy up unwarranted hopes which must fall, but they also smooth the way for quacks and fakers.

One of the pleasant features of the present Congress was the truthful and moderate reports that appeared in the daily papers. There must have been some sort of agreement between newspapers and officials of the Congress for scare-heads and sensational reports were extremely rare. The public was kept generously and truthfully informed.

EXPERT TESTIMONY

Recently New York state has seen an exploitation of the testimony of mental experts; two experts of the highest character and experience testifying that a murderer was legally insane at the time of the murder; two others testifying that he was legally and medically sane. This is a most unfortunate situation and again brings the testimony of the expert into discredit. It is high time that the medical profession, through its State and National organizations, insisted that the constituted legal authorities determine upon appointment of a commission which shall conduct its examination as a body and not as separate individuals, shall deliberate upon their findings and present then as a commission, even though members of that commission differ. If the commission is made up of three recognized experts there can be no possibility of a deadlock; and we will no longer have the spectacle of two or three testifying to the murderer's sanity and an equal number to the presence of mental disease. Rhode Island for a number of years past has been particularly free from this abuse of medical testimony, and it has been accomplished by the Attorney General's office appointing three representatives who should examine the individual on trial and should report back to the Attorney General's office. Sometimes this report has been that the defendant was responsible and sometimes irresponsible. Of course, this type of procedure does not necessarily mean that the counsel for the defense will not employ other experts, and that the State's experts and the defendant's experts may not disagree, but in Rhode Island the Attorney General's office has sought out three experts who commanded the respect of the medical profession and this has universally resulted in both State and defendant's counsel being willing to abide by the report of this commission. The medical profession should get behind legislation which would tend to make impossible the present spectacle of members of the medical profession forced to examine an individual separately for the defense and another group separately for the prosecution. If it were stipulated that the State should employ one expert and the defense another, and that these two should agree upon a third, or, in case they could not agree, that the State Medical Society should name a third ex-

pert, and that these three medical men should constitute a commission to examine the defendant jointly, and report as a commission, we would immediately strike a serious blow at the present commercialism which exists too frequently in medical expert testimony. Such a move should be backed solidly by the medical profession and there is every reason to believe that if the medical profession should agree on this type of legislation that it would meet with the highest cooperation of the legal profession, especially that part of it constituting the Attorney General's office. But until such time as this action is taken by the state medical society, or by the American Medical Association, it is probable that the present unfortunate situation will continue to exist, and a house divided against itself cannot command respect.

ETIOLOGY OF BILIARY INFECTION

The route of gall bladder infection has been under discussion for a long time. The commonest sources from which infection could arise are the duodenum, bile from the liver, lymphatics from the liver to the gall bladder and the cystic artery. Each source has been investigated and has had for a time its proponents. Wilkie and his associates have recently investigated this subject. They believe the commonest source of infection is through the cystic artery. The culture is best obtained from the sub-peritoneal coating of the gall bladder or from the lymph node near its neck and extends from there to the liver.

The investigators point out that failure to obtain positive cultures from the sub-peritoneal layer of a diseased gall bladder is largely due to failure to carry out the proper technique which they have developed.

OZENA

L. L. ALBERT, M.D.

229 VALENTINE LANE, YONKERS, N. Y.

There is a wide diversity of opinion as to the etiology of genuine ozena. The pathological picture is not perfectly clear and no one recognizes the incipient process with certainty. Similar clinical ozena pictures may be of entirely different

etiology. Of the many etiological theories, the infectious and microbiological origins have always had the most followers. Both luetic and tuberculous etiologies have been set forth. Various other bacteria have been isolated and described as the exciting causes. Among these are the bacillus described by Perez of Argentina, a pseudo-diphtheria bacillus, and a bacillus fetidus described by Hajek of Vienna. With the exception of Perez's work, the etiological factors described were proposed more on the basis of supposition than on valid experimentation.

About twenty years ago, Dr. Perez described a small coco-bacillus, "the bacillus-fetidus-ozena," as the cause of true ozena. His experiments were based on precise bacteriological analyses of the nasal secretions of ozena patients. He based his assertions on the power of these microbes to produce ozena fetor on artificial nutriment media; and on the transmission to rabbits of an ozena homologus to that in man. His extensive experiments proved that ozena is both infectious and contagious.

The greatest patience and exactitude are required to isolate the coco-bacillus. Myriads of other germs are present in the nasal secretions of ozena patients. These enter into competition on artificial plantings and give quite different culture pictures in simultaneous implantations upon various nutrient media. Perez found that isolation through an animal body was the best way of obtaining a pure culture. From a bouillon having the characteristic fetor a small amount was injected intravenously into a rabbit. From the purulent secretions which flowed abundantly from the animal's nose a few days later, the coco-bacillus was obtained in pure culture. In this way he attempted to prove that the coco-bacillus was the etiological factor in true ozena cases. Again, after analysis of the nasal flora of several normal rabbits, separate pure cultures of different bacteria were injected intravenously. Twelve hours later the animals injected with the coco-bacillus showed a decided increase of this particular bacillus in the nasal secretions, an increase which was not correspondingly present in the other injected animals.

Pathological specimens of noses of rabbits which had been injected showed marked changes in the turbinates. They were in all stages of inflammation from a simple hyperamia to complete

atrophy. And a final crusted stage existed similar to that of human ozena. Further experimentation showed that the Perez bacilli were capable of producing a genuine soluble toxin. The cultural fetor was so characteristic that it was considered pathognomonic of its generator's presence in a mixed culture.

Treatment was directed into the channel of a specific vaccine. This was accomplished by subcutaneous injections of destroyed coco-bacilli in an attempt to excite the active formation of specific antibodies. Such a vaccine may be curative or preventative; curative in chronic ozena cases, and usually preventative when used in infectious diseases anteceding acute ozena cases. The vaccine is a common saline infusion of tribes of organisms cultivated from various ozena cases. It is injected weekly in doses of five hundred to ten hundred million.

Syphilis and the pseudo-ozena brought about by severe suppuration of sinus cavities are not amenable to this type of vaccine and they should be ruled out before attempting to institute this form of vaccine treatment. In lues, the destruction is more extensive and the bridge of the nose is usually of the "saddle-back" variety.

The greenish-yellow crusts and scabs of ozena are due to the accumulation and drying of secretions on the surface mucosa. The dryness is due to the enlargement of the nasal cavities and the subsequent destruction of those elements in the mucus membrane which help furnish the normal moisture. Fetor usually runs parallel to the intensity of the crust formation.

The improvements derived from Perez's vaccine treatment may be divided into nasal, regional and general. A complete distinction is impossible. Local reactions at the site of puncture vary considerably. Slight reddening and infiltration are usually present. These symptoms appear after the first three injections. Later developments include a running nose, severe pulsation, nose bleed, reddened nares, a feeling of easier blowing of the nose, loosening of the crusts and a temporary increase of the odor. Regional reactions include reddening of the face, due to marked congestion, a feeling of heat in the head, headache, frontal pain, toothache, conjunctivitis, sore throat and ringing in the ears.

In favorable cases the crusts decrease and fetor diminishes to final disappearance. Daily nasal

irrigations may be reduced in number and later stopped altogether. A further observation is the disappearance of the distressing dry throat and larynx so common in ozena.

It is believed that active immunization with the coco-bacillus offers a favorable prognosis. The word cure is expressly avoided. Only time and further experimentation and observation can develop a proof-positive cure.

Operative treatment, consisting of breaking together the external walls of the nasal cavities or of inserting bone transplants under the septal mucosa so as to materially lessen the intra-nasal spaces, has been tried with varying success.

It is the sad fate of those afflicted with ozena not only to be debarred from society, but often to be deprived of the opportunity of earning a livelihood. Therefore anything which offers some possibility of improvement in this condition certainly should be given a welcome. Perez's vaccine will improve about eighty per cent of the usual run of ozena cases. About twenty per cent will remain uninfluenced.

SOCIETIES

PROVIDENCE MEDICAL ASSOCIATION

The regular monthly meeting of the Providence Medical Association was called to order by the President, Dr. Arthur H. Ruggles, Monday evening, October 7, 1929, at 8:50 o'clock. The records of the last meeting were read and approved. The Standing Committee having approved their applications the following were elected to membership:

Ezra Sharp Francesco Ronchese

Dr. W. Louis Chapman showed an X-ray of cancer of the esophagus. Also another which he felt to be calcified deposits about the pelvic region. Also a case of extreme constipation apparently from visceroptosis and one where the transverse colon was above the stomach. Dr. J. E. Kerney showed a wooden penholder removed by perineal section from the prostrate.

The first paper of the evening was the Gradenigo Syndrome by Dr. James W. Leech. It is a triad: 1. Purulent discharge from the middle

ear. 2. Paralysis of the sixth nerve, and 3. Severe pain in the fifth nerve. It is due to the close relationship of the abducent nerve and fifth nerve to the petrous bone. Dr. Leech reported four cases. Two of these recovered without mastoid operation but nevertheless he feels such operation is indicated. The paper was discussed by Dr. Adams, Dr. L. B. Porter, Dr. Messinger, Dr. C. A. McDonald and Dr. Leech.

Next was a report of a Post Operative Death with Autopsy Findings by Dr. Anthony Corvase and Dr. Everett H. Smiley. After an appendectomy without acute appendicitis a 17 year old girl died within a week with extensive liver necrosis and severe hemorrhagic condition in the heart muscle. Dr. Ewing felt this to be a toxic condition and Dr. Mallory an infection.

Dr. Wilfred Pickles read a paper on the Technique and Value of Encephalography. He introduces air into the ventricles by withdrawing all the fluid possible by lumbar puncture and introducing air. The pressure is measured and brought back to normal by air. He showed a series of slides illustrating the anatomy, the presence of air in the different spaces in normal and abnormal conditions and in one case of his own one ventricle was practically obliterated. This came to operation and autopsy and a long dural endothelioma was demonstrated. The paper was discussed by Dr. Gerber, Dr. C. A. McDonald, Dr. Batchelder, Dr. Kelly, Dr. Sanborn and Dr. Pickles.

The meeting adjourned at 10:45 P. M. Attendance 67. Collation was served.

Respectfully submitted,

PETER P. CHASE,
Secretary.

ANNOUNCEMENTS

On May 13, 1930, the United States Pharmacopoeial Convention will meet in Washington, D. C., to organize the work of revision of this official standard for drugs and medicines. The Convention meets but once in each decade and the societies and organizations entitled to representation in the Convention are named in its constitution and by-laws. In order to admit new members to the Convention it is necessary to amend the constitution and by-laws. The method

of making such amendments is that they must first be voted on by the Board of Trustees, then published in the medical and pharmaceutical journals and voted on finally by the Convention itself.

The following amendments* to the Constitution and By-Laws of the United States Pharmacopoeial Convention are recommended by the Board of Trustees:

CONSTITUTION

ARTICLE II

Membership

SECTION 1. The members of the United States Pharmacopoeial Convention, in addition to the Incorporators and their associates, shall be delegates elected (*contingently*) by the following organizations in the manner they shall respectively provide: Incorporated Medical Colleges, and Medical Schools connected with Incorporated Colleges and Universities; Incorporated Colleges of Pharmacy, and Pharmaceutical Schools connected with Incorporated Universities; *Departments of Incorporated Universities, which Departments are devoted to scientific research in chemistry or in other lines related to chemistry or pharmacy*; Incorporated State Medical Associations; Incorporated State Pharmaceutical Associations; the American Medical Association; the American Pharmaceutical Association, the American Chemical Society, the National Association of Retail Druggists, (and) the National Association of Boards of Pharmacy, and the *Federation of State Medical Boards of the United States.*

Medical and Pharmaceutical Associations and Colleges of Medicine and Pharmacy in Hawaii, Porto Rico, the Philippine Islands and in the Republic of Cuba (where the Pharmacopoeia of the United States has been adopted as the official pharmacopoeia) shall like wise be entitled to representation by delegates on the same basis as the other Associations and Colleges mentioned in this Section.

SEC. 2. Delegates appointed by the Surgeons-General of the United States Army and Navy, and the Surgeon-General of the United States Public Health Service, the Secretary of Agri-

culture, of Commerce, the Association of Official Agricultural Chemists, the Association of American Dairy, Food and Drug Officials, the National Wholesale Druggists' Association, the National Dental Association, the American Drug Manufacturers' Association, *the American Pharmaceutical Manufacturers' Association, the Federal Wholesale Druggists' Association*, the United States Division of Customs, (and the University of Havana) and by the organizations not hereinbefore named which were admitted to representation in the Convention of 1900, shall also be members of the corporation.

BY-LAWS

CHAPTER VII

Of the Committees on Credentials and Arrangements

ARTICLE 1. The Committee on Credentials (and Arrangements) shall consist of five members and shall be appointed by the President from among the delegates to the decennial meeting, not less than two months before the meeting.

ART. 2. It shall be their duty to examine carefully the credentials of all delegates. *Credentials issued in blank, leaving the names of the delegates and alternates to be inserted subsequently by other than the regularly constituted officers of the appointing associations or institutions, shall not be accepted as meeting the requirements of this Chapter.* Immediately before the meeting of the Convention they shall furnish to the President a roll containing the names of the Incorporators, the Officers of the Convention, the Board of Trustees, the General Committee of Revision and of those delegates whose credentials are unquestioned and approved. They shall also make a report to the Convention concerning all credentials which have been questioned, or appear to them to be of doubtful validity.

ART. 3. (The Committee shall continue in office until their successors are appointed). *The Committee on Arrangements shall consist of five members residing in or convenient to the City of Washington, D. C., and appointed by the President.*

CHAPTER IX

Of Meetings

ART. 1. The regular decennial meetings of the Convention shall be held upon the second Tues-

*(abstracted)

day in May every twenty years as provided in the Constitution and the place of meeting shall be in the City of Washington, D. C.

BOOK REVIEWS

THE HISTORY OF NURSING. By James J. Walsh, M.D., Ph.D. P. J. Kenedy & Sons, New York, N. Y., Publishers.

In this history the author has confined himself almost entirely to the work of the Catholic nursing orders from early time to the present day. One is impressed with the great contribution made by these devout women not only to nursing but to medicine. It was service of the highest order, and Dr. Walsh has presented the subject in an understanding way.

The book will be of interest to both Doctors and Nurses. It should also give the general reader a better understanding of nursing history, for probably no other history of its kind now available would make the same appeal. Illustrations would have added to the interest of those unfamiliar with the history of nursing.

This book will supplement the History which is commonly used in schools of nursing today. If the author intended it for this purpose, one cannot help but wish that an index had been included to facilitate reference reading, since there is a wealth of material in the Introduction and twenty-one chapters.

CLINICAL LABORATORY METHODS. By Russell Landram Haden, M.A., M.D., Professor of Experimental Medicine, University of Kansas, School of Medicine. The C. V. Mosby Company, Publishers, St. Louis, 1929.

Choice of Laboratory procedures will always be a matter of personal preference. The ones listed here are for the most part accepted and workable methods. The small practical importance of quantitative chemical examination of the urine hardly justifies the space allotted to it. As in the previous edition the Kolmer technic of the Wassermann is retained. This is in accord with the trend toward standardization of this important test. For a book which purports to describe only methods

which have "proved both practical and dependable" the elaborate classification of the streptococci given seems unwarranted. The chapter of histological technic is usually omitted from works of this sort. It is too brief to adequately present the subject and the choice of methods might well be questioned. One who is in need of concise and workable descriptions of the technic of clinical laboratory procedures should find this volume useful.

A STUDY OF MASTURBATION (Second edition), by John F. W. Meagher, M.D., F.A.C.P., published by William Wood and Company,

New York, is a book which seems to be a result of the author's reading of many articles and books which treat of masturbation from various points of view. He quotes and emphasizes chiefly psychoanalytic studies and apparently feels that they contribute most of his study. The book adds little to the knowledge of the subject.

TREATMENT OF FRACTURES, by Lorenz Bohler. (Translated by M. E. Steinberg.) Wilhelm Maudrich, Publisher.

The author describes the treatment and analyzes the results in a large number of fractures. Many features of interest in the proper reduction of fractures are emphasized to advantage. The only point susceptible to criticism is that the author may be over-enthusiastic in his use of local anaesthesia for the reduction.

It seems a book for the specialist in traumatic surgery rather than for the general practitioner.

THE PRINCIPLES AND PRACTICE OF ELECTROCARDIOGRAPHY. By Carl J. Wiggers, M.D. C. V. Mosby Co., Publishers.

This is probably the most authoritative and comprehensive book published on this subject.

Part 1 deals with the principles of the electrocardiograph itself and unless one has a good knowledge of electricity, the first part will be hard to understand. Further, as the author suggests, one should have a good knowledge of the instrument.

Part II contains exceedingly valuable information in that the reasons for various movements of the string are clearly expressed and illustrated.

Part III explains pathological curves for which the electrocardiograph is most useful.

Parts II and III are clearly written and contain fundamental information without which a physician cannot expect to become more than an ordinary technician in electrocardiographic work.

A few pages in Part I devoted to electricity might greatly aid the doctor who is trying to master a very technical subject.

OSTEOMYELITIS AND COMPOUND FRACTURES, by
H. Winnett Orr, M.D., C. V. Mosby Com-
pany, Publishers.

Dr. Orr, in his book, emphasizes the necessity of rest in the treatment of osteomyelitis and in the treatment of compound fractures. Adequate wound treatment is essential but proper fixation and rest with as little disturbance of the wound as possible are equally important. The author demonstrates that infrequent dressing of wounds, thus only disturbing the tissues at long intervals, promotes early healing.

Much may be learned from a careful reading of his book by those interested in the treatment of these two serious conditions. It is a book well worth reading.

MISCELLANEOUS

AN UNAPPRECIATED CAUSE OF CHRONIC BRONCHITIS

Following the bronchographic examination of a large number of patients suffering from so-called chronic bronchitis, evidence of bronchial dilation was found by Alton Ochsner, New Orleans (*Journal A. M. A.*, July 20, 1929), in more than 90 per cent of the cases. He says that cases of chronic bronchitis lasting over a period of months or recurrent attacks of acute bronchitis should be given the advantage of a bronchography. The introduction of iodized oil into the tracheobronchial tree is of distinct therapeutic value not only in those cases of chronic bronchitis and recurrent

attacks of acute bronchitis but also in the cases of definite bronchiectasis with large amounts of foul sputum. The method used for introducing the iodized oil into the tracheobronchial tree should be simple; it should not require a great deal of technical skill; it should be easy to carry out, harmless and not unpleasant for the patient. This is best accomplished by the passive technic.

ARSPHENAMINIZED SERUM THERAPY OF CEREBRO-SPINAL SYPHILIS

The Swift-Ellis treatment was employed by Henry S. Blesse, Hot Springs National Park, Ark. (*Journal A. M. A.*, July 20, 1929), in a series of 100 cases without modification. The object of this series was to note the influence of arspenaminized serum therapy on the spinal fluid Wasserman reaction of patients, suffering from cerebrospinal syphilis, whose spinal fluid Wasserman reaction had not been disturbed by two intensive courses of arspenamine administered intravenously. The intraspinal treatment was given by administering 0.75 Gm. of neoarsphenamine intravenously, and five minutes later 50 cc. of blood was withdrawn from the patient by the open method of introducing an 18 gage needle into a convenient vein. Blood was then kept at room temperature for one hour to permit clotting, after which the clot was freed from the sides of the tube or container with a platinum wire. It was then placed in the refrigerator for twenty hours, after which 15 cc. of serum was removed by pipet. The serum obtained was then inactivated for thirty minutes in an oil bath at 57 C., after which it was cooled to room temperature. Spinal puncture was then performed with a 20 gage spinal needle, after which the 15 cc. of serum was introduced by the gravity method. Of the 100 patients that received two courses of intraspinal therapy, twenty-eight had negative spinal fluid Wasserman reactions in all dilutions, on completion of all treatment, thirty-four had distinct reduction, there was slight reduction in nineteen, and in the remaining nineteen there was no change. Only nine patients failed to show clinical and symptomatic improvement. The remaining ninety-one patients were distinctly improved. There was not an instance of a severe reaction following or during treatment.